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ABSTRACT

This paper looks at issues subsumed by the phrase "learning to teach" that have implications for the design and conduct of teacher education. The first section lays out a temporal perspective by examining the times and places of learning to teach. The second section brings together disparate strands of research on the learners of teaching, looking at who prospective teachers are, orientations to learning, experience with diversity, and prospective teachers' beliefs about teaching and learning, subject matter, students, and preservice and beginning teachers. The third section examines different ways people have conceptualized the content of learning to teach, including domains of professional knowledge, the tasks of teaching, professional standards, and lessons for teacher educators. The fourth section discusses processes and opportunities in learning to teach. By presenting ideas about the when/where, who, what and how of learning to teach, the study hopes to raise teacher educators' consciousness about a neglected part of the conceptual and practical foundations of their work. (Contains 107 references.) (Author/ND)

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National Center for Research on Teacher Learning

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NATIONAL CENTER FOR RESEARCH ON TEACHER LEARNING

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Abstract

This paper looks at issues subsumed by the phrase "learning to teach" that have implications for the design and conduct of teacher education. The first section lays out a temporal perspective by examining the times and places of learning to teach. The second section brings together disparate strands of research on the learners of teaching—preservice and beginning teachers. The third section examines different ways that people have conceptualized the content of learning to teach, while the fourth section discusses learning processes and opportunities. By presenting ideas about the when/-where, who, what and how of learning to teach, the authors hope to raise teacher educators' consciousness about a neglected part of the conceptual and practical foundations of their work.

PERSPECTIVES ON LEARNING TO TEACH

Sharon Feiman-Nemser
Janine Remillard

This chapter provides teacher educators with perspectives on learning to teach that have implications for the structure, content, and pedagogy of teacher education. For some time, teacher educators have looked to research on teaching for guidance in designing programs for teachers. But knowing what good teachers do, how they think or what they know is not the same as knowing how teachers learn to think and act in particular ways and what contributes to their learning. Researchers, policymakers, and teacher educators are beginning to recognize that understanding more about who teachers are as learners, what they need to know, and how they learn their craft can help in clarifying the role of formal teacher education in learning to teach.

The phrase "learning to teach" rolls easily off the tongue, giving the impression that this is a straightforward, easily understood process. In fact, we do not have well developed theories of learning to teach, and the phrase itself covers many conceptual complexities. What does learning teaching entail? How is teacher learning similar to and different from other learning? What sort of teaching is being learned? What sort of teaching do we hope teachers will learn? As these questions imply, learning to teach raises both descriptive and normative issues which must be addressed in any serious effort to build a model of learning to teach.

Of course, common sense theories abound. "Anyone can teach." "If you know your subject, you can teach it." "Teachers are born not made." "Everything you need to know about teaching can be learned on the job." (Widely held in our society, these assertions find little support in the field or the research literature. Nor do they accord a significant role to teacher education.)

Despite the absence of dependable theories, teacher education programs and policies reflect different ideas about learning to teach. For instance, the traditional structure of preservice programs—foundations courses followed by methods courses followed by student teaching—implies that learning to teach is a matter of first acquiring formal knowledge and then applying it in the field. Policies that limit professional

education requirements for undergraduates and increase academic requirements endorse the view that academic study offers the most important preparation for teaching. And policies that mandate the assessment of beginning teachers without providing them with assistance rest on an implicit assumption that learning to teach is not a lengthy or serious undertaking since it can be completed in a short time. Like the common sense theories mentioned above, these ideas also lack compelling empirical support.

A major purpose in writing this chapter is to persuade teacher educators that attending to issues subsumed by the phrase "learning to teach" can enhance the design and conduct of university- and school-based teacher education. In order to unpack the phrase "learning to teach," we have to ask questions about who is doing the learning, what they are learning, how the learning proceeds, and when/where the learning takes place. By exploring questions about teachers as learners, about teaching as a practice to be learned, about teacher learning as a complex social-psychological process that occurs over time in different contexts, we can begin to understand some of the theoretical, practical, and normative issues covered by the phrase "learning to teach."

We organize this chapter around different though related aspects of learning to teach, pulling each forward one at a time to discuss salient issues and to present illustrative findings. The first section presents a temporal perspective on learning to teach. The second section looks at preservice and beginning teachers as learners. The third section examines different ways that people have conceptualized the content of learning to teach, while the fourth section discusses learning processes and opportunities. By presenting ideas about the when, where, who, what, and how of learning to teach, we hope to raise teacher educators' consciousness about a neglected part of the conceptual and practical foundations of their work.

TIMES AND PLACES IN LEARNING TO TEACH

Learning to teach is not synonymous with teacher education. Teacher educators intervene in a process that begins long before teachers take their first education course and that continues afterwards on the job. Nor can teachers' formal learning about

teaching be confined to professional studies since teachers learn about their subjects and the teaching and learning of those subjects in other academic contexts, including elementary and secondary school, as well as on the job. These basic facts about the times and places of learning to teach have important implications for teacher education. In this section we outline the chronology of learning to teach, locating formal teacher education in a broad temporal framework, and identifying important issues concerning the curriculum of teacher education that derive from this perspective.

The Chronology of Learning to Teach

It is hard to say exactly when learning to teach begins. From an early age we are surrounded by teaching, most notably by parents and teachers. These early experiences with authority figures help shape teachers' pedagogical tendencies (Stephens 1969, Wright and Tuska 1968, Nemser 1983).

The influence of schooling is especially strong. Future teachers spend thousands of hours in elementary and secondary school watching what teachers do and developing images about and dispositions toward teaching, learning, and subject matter. This long, informal "apprenticeship of observation" (Lortie 1975) distinguishes learning to teach from other kinds of professional learning, posing unique challenges for teacher educators.

Formal preparation for teaching occurs in universities and schools. Teachers are supposed to lay an intellectual and practical foundation for teaching in education courses and field experiences. Many teachers say that their preservice program did not prepare them for teaching, and a variety of research using both surveys and case methods documents the limited impact of teacher education on prospective teachers' perspectives and beliefs (e.g., National Center for Research on Teacher Education 1991; Tabachnick, Popkewitz, and Zeichner 1979/80). At the same time, we have some evidence that powerful and innovative teacher preparation can affect the way teachers think about teaching and learning, students and subject matter (See, for example, Florio and Lensmire 1990; Ball 1990; Feiman-Nemser and Featherstone 1992; Cochran-Smith 1991).

Preparation for teaching also includes academic study in liberal arts courses where intellectual dispositions are shaped and subject-matter knowledge is acquired.

Research on what prospective teachers actually learn in liberal arts courses raises questions about whether academic study automatically provides teachers with the kind of subject-matter knowledge they need to foster meaningful and integrated understandings in their students (McDiarmid 1990). Still, university study of academic subjects does influence the way teachers think about knowledge and approach the teaching of academic content (Wilson, Shulman, and Rickert 1987; Grossman 1990; Wilson and Wineberg 1988).

No matter how much teachers learn during preservice preparation, learning teaching inevitably occurs on the job. First year teachers essentially have two jobs—they have to teach, and they have to learn to teach (Wildman, Niles, Magliaro, and McLaughlin 1989). The spread of induction programs suggests that policymakers recognize what teachers know and research confirms—that the first year of teaching is an intense and potentially formative phase in learning to teach (Lortie 1975; Nemser 1983).

No one learns to teach in a year. Efforts to describe the "stages" teachers go through in learning to teach through generally posit an initial stage of survival and discovery, a second stage of experimentation and consolidation, and a third stage of mastery and stabilization (See, for example, Fuller and Brown 1975; Field 1979; Watts 1980; Berliner 1986). These stages are loosely tied to amounts of experience with stabilization occurring around the time of tenure.

Self-knowledge appears to be a major fruit of early teaching (Kagan 1992). In what Featherstone (1993) calls "the journey in, the journey out," novices begin to craft a professional identity through their struggles with and explorations of students and subject matter. Over time teachers develop instructional routines and classroom procedures and learn what to expect from pupils. Experience generally yields greater confidence, flexibility and a sense of professional autonomy. After five to seven years, most teachers feel they know how to teach. Whether we choose to call these teachers "masters" or "experts," depends on how we define mastery and expertise (Leinhardt 1988; Livingston and Borko 1989; Carter, Sabers, Cushing, Pinegar, and Berliner 1987).

Research on teachers' professional lives reveals that learning and change do not necessarily stop once teachers consolidate a teaching style. Still, it becomes more difficult to describe a common trajectory (Huberman 1989). Personal dispositions,

educational opportunities, and social and political movements provide incentives for continued learning, but whether learning is incremental or dramatic seems to vary with the individual teacher, the school, and the socio-political context.

Lessons for Teacher Educators

This temporal portrait of learning to teach sets the stage for thinking about what teacher education should be like at different times and in different places. It also foreshadows our discussion about who teachers are as learners, what they need to learn, and how that learning can be fostered. For example, knowing that biography plays a powerful role in learning to teach does not tell us what teacher candidates have come to believe about teaching or how we should work with those beliefs during teacher preparation. It does, however, focus our attention on the content of teacher candidates' beliefs and how that content helps or hinders professional learning. Similarly the fact that the first year of teaching is mostly a time of learning does not tell us what novices need to learn. It should, however, push us to conceptualize the content of learning to teach and to sort out what can best be taught and learned at the university prior to teaching, what can best be learned through guided practice in someone else's classroom, what should be learned through structured induction support, and what depends on learning from teaching over time.

TEACHER CANDIDATES AS LEARNER

All good teachers, including teacher educators, draw on knowledge about their students in deciding what and how to teach. Fortunately there is a growing literature on who teacher education students are and what they bring to teacher education in the way of entering knowledge, beliefs, and dispositions. In this section we sample three areas of scholarship that shed light on teacher candidates as learners—demographic surveys, studies of women's ways of knowing, and research on the content of teacher candidates' beliefs. We also consider the obligation of teacher educators to learn about their own

students' backgrounds and entering beliefs and the ways they make sense of their professional studies and teaching experience.

Who Prospective Teachers Are

Demographic profiles of teachers and teacher education students suggest remarkable similarity and stability. The data also reveal several characteristics that distinguish teacher education students as a group from their higher education colleagues. Because of limitations in the research (e.g., too little attention to subpopulations such as elementary vs. secondary candidates and too much reliance on samples from single institutions), we should regard the generalizations with caution (Brookhart and Freeman 1992). Still, the patterns help us think about who teacher education students are in relation to what they need to become as professional teachers.

Teacher education students are not likely to upset the demographic stability of the current teaching population. The typical American teacher is a Caucasian female, married with two children. She teaches in a suburban elementary school. She is not politically active (Feistritzer 1986). The typical teacher candidate is female; 75% of prospective secondary teachers and 93% of those intending to teach elementary, compared to 54% of all student in higher education, are women. Ninety-three percent are Caucasian, 10% more than all higher education students. Over half of these students grew up in small, rural towns or suburbs. Few are from large, urban areas. Most attend college full time. The average age is 25, and a third of those intending to teach elementary school are already married (Book and Freeman 1986; Brookhart and Freeman 1992).

Teacher education students have been characterized as "culturally insular" with "limited career horizons." Most selected their university because of its proximity to home, and few wish to travel or work more than a hundred miles from their hometown. A majority prefer to teach middle class children of average ability in traditional settings. In one national survey, 57% percent said they wanted to teach in suburban areas, while only 15% expressed interest in teaching in urban settings (Zimpher 1989).

While over generalized, this portrait of prospective teachers highlights domains of experience that could be informative to teacher educators. Three areas seems especially salient: (1) prospective teachers' experiences as women; (2) prospective teachers' limited

exposure to people who are socially, ethnically, and culturally different from themselves; and (3) prospective teachers' experiences as students in school.

Orientations to Learning

Research on feminist epistemology and on women's perceptions of the work of teaching shed light on how many women perceive themselves as learners and teachers (Belenky, Clinchy, Goldberger, and Tarule 1986; Gilligan 1982; Biklen 1983; Laird 1988). Given the preponderance of women in teaching and teacher education, this research can help us think about how preservice students may approach teacher preparation and teaching.

Many students who choose to become teachers are hard-working and serious. They have grown up in a school system that rewards passivity and obedience rather than self-directed learning. They have learned to see teachers and texts as authoritative sources of knowledge. Seldom have they been encouraged to build their own knowledge or value their own ideas and questions. Disenfranchised as learners, they have achieved success by figuring out what the teacher wants and by doing it (Belenky et al. 1986).

For many women, success in formal education is strongly linked to a sense of self. While men are more apt to blame poor school performance on bad luck or circumstances beyond their control, women tend to interpret bad grades and teacher reproofs as indicators of their own inadequacies (Belenky et. al. 1986; Holland and Eisenhart 1990; McDade 1988). Large numbers of women describe their college classes as stifling and disempowering, reminding them of their mental shortcomings. These orientations toward schooling and higher education are likely to influence how preservice teachers think about themselves as learners and how they approach learning to teach.

Teacher candidates' orientations toward learning to teach are also influenced by their views of teaching as work. Many preservice teachers, particularly those who are women, choose teaching because of its nurturing and caring attributes. In a survey of over 400 elementary teacher candidates, Book, Byers, and Freeman (1983) found that many viewed teaching as "an extended form of parenting" learned through experience and dependent on natural instincts and intuitions. Because respondents emphasized the

nurturing aspects of the teacher's role over responsibilities for intellectual development, they assumed that teacher education had little to teach them.

By telling us about a significant proportion of our students, research on women's ways of knowing highlights a central challenge for teacher educators—helping intending teachers develop intellectual confidence. Unless teacher candidates experience their own intellectual powers, they may not value this quality in their pupils.

Experience With Diversity

In order to build bridges between students and subject matter, teachers need to know how their students think about what they are learning. Attending to the thinking of others means trying to see the world through their eyes. Like most people, teachers often assume that students who share their language and culture, experience it as they do (Jackson 1986). Like the teacher candidates interviewed by Holt-Reynolds (1992), they ask "What works for me?" in deciding what will work for their students. One of the central tasks of teacher education is to help teacher candidates overcome this "presumption of shared identity" in order to learn to attend to the thinking and actions of others (Jackson 1986).

When we consider the ethnic and cultural diversity of American school children and the homogeneity and cultural insularity of those intending to teach, this task becomes increasingly more complex. The "narrow framework of experience" (Paine 1989) that teacher candidates often bring to teacher education has provided limited contact with people who are ethnically or culturally different from themselves and few opportunities in their formal schooling to consider that others may learn, understand, or experience things differently. Drawing on their own experience, they develop assumptions about the learning and thinking of others that fit with their own. Even more problematic is the tendency to interpret differences in approaches or orientations to learning or schooling as indicators of limited cognitive ability or lack of motivation. Wary of racial stereotypes, teacher candidates resist cultural or ethnic explanations for student performance (Paine 1989).

Teacher educators must help prospective teachers learn to look beyond their own experience and actively seek to know students, their thinking, and culture. Teachers and

teacher candidates can also benefit from gaining perspective on their own cultural roots and the beliefs they have developed as a consequence (Cazden and Mehan 1989).

Prospective Teachers' Beliefs

The beliefs and commitments that intending teachers hold significantly influence what they learn in teacher education (Calderhead 1991; Bird and Anderson 1992; Borko, Livingston, McCaleb, and Mauro 1988). Having spent more than 13 years in classrooms learning about teaching through an "apprenticeship of observation" (Lortie 1975), prospective teachers have beliefs about what teachers do and say, how children learn, and what should be taught (Ball 1988; Feiman-Nemser and Featherstone 1992; Weinstein 1988). Recent research on the content of these beliefs can alert teacher educators to images and ideas their students may hold while providing a map of relevant categories of beliefs to explore (Nespor 1987).

Beliefs About Teaching and Learning. Like much of our society, prospective teachers believe that teaching is a process of passing knowledge from teacher to student and that learning involves absorbing or memorizing information and practicing skills (Cohen 1988; Cuban 1984; Ball and McDiarmid 1987; Calderhead and Robson 1991). Students wait like empty vessels to be filled, and teachers do the filling. Teachers tell students what they need to know, and students listen and learn (e.g., memorize) what they have been told. When prospective teachers imagine themselves teaching, they often picture themselves standing before a group of students presenting, talking, explaining, showing, "going over" the material to be learned (Ball 1988).

This perspective places sole authority for knowing on the teacher, making her the source and provider of information. It is reflected in a common concern of teacher candidates—that they might not be able to answer students' questions. Deeply-rooted, these views of teaching and learning are not likely to change unless alternative experiences challenge their validity (Duckworth 1987; McDiarmid 1992; see the discussion on conceptual change and learning to teach in the last section of this chapter).

Beliefs About Subject Matter. The views of teaching and learning sketched above relate to and are supported by beliefs about subject matter. Most often, the subject matter is seen as a fixed collection of facts, concepts, and skills that must be "learned" before they can be applied (Ball 1988; Florio and Lensmire 1990; Grossman 1990; Leinhardt and Smith 1985). For example, mathematics is often viewed and treated as a set of discrete rules best learned through repeated practice. Based on their own experiences as students, prospective teachers think of "doing math" as a matter of completing a page of 40 problems. While reading and writing may be viewed as more creative, expressive, and pleasurable, many preservice teachers also regard these subjects as highly prescriptive and rule-based (Hollingsworth 1989). They consider approaches to instruction that are not rigidly sequenced or structured or that encourage student collaboration unsettling (Florio and Lensmire 1990). Given these views of knowledge, it is not surprising that many prospective teachers believe they already know most of what they need to teach (McDiarmid 1992).

Beliefs About Students. Prospective teachers also have preconceptions about their future students rooted in their experiences in and outside school and their commitments to the altruistic, nurturing ideals of teaching (Brookhart and Freeman 1992; Weinstein 1988). Often these beliefs are contradictory. On the one hand, prospective teachers believe that they should treat all students fairly. This generally means the same. At the same time, they hold that every child is unique and deserves an education suited to his or her special needs (McDiarmid 1991; Paine 1989). The tension between treating students as individuals and treating all students alike may cause intending teachers to disregard or overlook student diversity that is race- or class-related and that reflects social inequities.

Limited experience and exposure to stereotypes embraced in mainstream society shape preservice teachers' perceptions of diverse groups. In one study researchers found that many preservice teachers are willing to accept ethnic or cultural stereotypes about groups of students to explain certain behaviors or to adjust their expectations for students (Paine 1989; McDiarmid 1992). Some believe that certain ethnic groups "are more concrete oriented" or respond more readily to particular instructional styles

(McDiarmid 1992). Others confound low-achievement with lower class. Such views hardly represent dependable bases for pedagogical decisions.

Learning About the Learners of Teacher Education

We have sampled three areas of scholarship that shed light on who teacher candidates are as learners and what they bring to teacher preparation. The research sensitizes us to possible beliefs and orientations that intending teachers might hold and helps us think about what we can build on and what needs to be challenged. It underscores the need for teacher educators to investigate their own students' backgrounds and beliefs. Finally, it highlights an opportunity for teacher educators to add to the knowledge base of teacher education by extending and refining our understanding of teacher education students as learners.

THE CONTENT OF LEARNING TO TEACH

We cannot talk about learning to teach without considering the content of that learning. In learning to teach, what do teachers need to learn? Answers to this question bear on decisions about the curriculum and pedagogy of teacher education. They also reflect ideas and assumptions about what teaching is like and what forms of knowledge and expertise guide teachers' practice.

Most often, the question of what teachers need to learn is framed in terms of professional knowledge and skills. We ask, "What do teachers need to know and be able to do in order to teach?" While lacks in knowledge and skill may limit what teachers can do, having them does not guarantee their wise use. Recently some researchers and teacher educators have begun to use the term "dispositions" to signal additional qualities, sensibilities, attitudes, and commitments required for teaching. Dispositions are tendencies or inclinations to act in particular ways. Tied to occasions, they unite ability with desire (Schwab 1976).

Thinking of the content of learning to teach in terms of knowledge, skills, and dispositions provides a rough analytic starting point. The larger challenge is specifying

what these categories consist of and how their contents interact in teaching. This is generally referred to as defining a knowledge base for teaching, though the term "knowledge base" often connotes a narrower undertaking (Tom and Valli 1990). Even though the knowledge base rhetoric far outstrips the reality, some progress has been made. This progress reflects shifting paradigms in research on teaching from a focus on what teachers do to a focus on how they think and then on what they know and how they organize and use their knowledge (See Shulman 1986b for a review).

We organize this discussion around three contemporary efforts to frame the content of learning to teach. The first, *Knowledge Base for Beginning Teachers* (M. Reynolds 1989), outlines various domains of professional knowledge that beginning teachers need to know about in order to do their work. The second, formulated by Anne Reynolds at the Educational Testing Service (A. Reynolds 1992), identifies core teaching tasks on the assumption that if novices can perform these tasks, they possess the requisite knowledge and skills required for beginning teaching. The third, based on work of the National Board for Professional Teaching Standards (National Board for Professional Teaching Standards 1990), offers a set of standards which integrate knowledge, skills, and dispositions required for excellence in teaching. While they illustrate the state of the art, these examples also reveal the limits of our knowledge about what teachers need to learn and the challenges that face teacher educators in trying to figure out what to teach.

Domains of Professional Knowledge

One effort to articulate a distinctive body of knowledge for teaching is contained in a 286 page volume called *Knowledge Base for Beginning Teachers* (M. Reynolds 1989). Commissioned by the American Association of College of Teacher Education, *Knowledge Base for Beginning Teachers* attempts to describe what every beginning teacher should know. The preface spells out the assumptions guiding the project: (1) We know enough to codify a knowledge base for teaching; (2) The knowledge base is inevitably incomplete and changing; (3) It takes various forms and comes from diverse sources; (4) It can be structured in different ways.

The project organizers identified domains which, in their judgement, every beginning teacher should know about. Then they invited experts associated with each

domain to write a chapter outlining "confirmed knowledge" appropriate for "professionally responsible beginning teachers." The table of contents reveals topics that are part of the emerging work on professional knowledge for teaching (Shulman 1987; Grossman 1990)—classroom organization and management, learners and learning, classroom instruction, the developmental needs of pupils, subject-matter knowledge for teaching, subject specific pedagogy, knowledge about reading and writing, students with special needs, the social organization of classes and schools, the school district, ethical dimensions of teaching, to name about half of the chapter titles.

Knowledge Base for the Beginning Teacher reflects the range and richness of professional knowledge that bears on teachers' work, but it leaves open the question of what it means to know and use such knowledge in teaching. To explore this issue, we briefly examine the treatment of four domains of knowledge directly related to the central task of teaching—connecting students and worthwhile subject matter. This allows us to highlight the special status of subject-matter knowledge and its interaction with other domains and to acknowledge the role and limits of propositional knowledge as a guide to practice.

Traditionally not part of the teacher education curriculum, subject-matter knowledge is a central component of the content of learning to teach. Whatever else teachers need to know, they need to know their subjects. Current educational reforms have prompted renewed interest in teachers' subject-matter knowledge because they call for a kind of teaching that promotes powerful and flexible knowledge and understanding in students (see, for example, Brophy 1989; Cohen 1989). Still the question of what teachers need to know about their subjects to realize this goal has been difficult to answer (Kennedy 1991).

Grossman, Wilson, and Shulman (1989) provide a very general answer by specifying three kinds of subject-matter knowledge for teaching—content knowledge which includes knowledge of facts, concepts, and procedures within a discipline; substantive knowledge or knowledge of explanatory frameworks in a field; and syntactic knowledge or knowledge of the ways in which new knowledge is brought into a field. A growing body of case studies of subject-matter teaching reveals how the presence or absence of this kind of knowledge affects the learning opportunities that prospective and

practicing teachers provide for their students. (For one review of this work, see Ball and McDiarmid 1990). These portraits make a compelling case for why teachers need deeper and more flexible subject-matter knowledge than they generally have a chance to learn. Combined with mounting evidence that even prospective teachers who major in the subjects they teach often cannot explain fundamental concepts in their discipline (National Center for Research on Teacher Education 1991), the research underscores the importance of addressing this often neglected domain of knowledge for teaching.

McDiarmid, Ball, and Anderson (1989) extend the argument about subject-matter knowledge in their treatment of subject specific pedagogy (also called pedagogical content knowledge). They concentrate on the role of instructional representations which include all the different ways that teachers convey messages to pupils about the substance and nature of a subject—activities, questions, problems, explanations, as well as the way answers are sought and validated. They argue that prospective teachers need to develop a repertoire of representations for the subjects they teach and standards for judging the validity and appropriateness of different representations. This will enable teachers to design and adapt learning activities that foster ideas and patterns of thinking parallel to knowledge and ways of thinking in the academic disciplines.

In two related chapters, Linda Anderson (1989a, 1989b) outlines compatible perspectives on learners, learning, and classroom instruction. Arguing that beginning teachers need to develop coherent personal theories to guide their perceptions and decisions, she presents a small set of core ideas about learners and learning which she translates into a perspective on classroom instruction. Rooted in constructivist theory and research, these concepts about knowledge, metacognition, and motivation, on the one hand, and academic tasks, scaffolding, and learning environments, on the other, provide the intellectual foundation for a personal theory of learning and teaching. Besides learning what these concepts mean, Anderson argues, prospective teachers must learn how the concepts relate to each other and how they come together in particular teaching episodes.

Framing a professional knowledge base around discrete domains helps us appreciate the range of knowledge and values that bear on teaching. At the same time, it misrepresents the interactive character of teachers' knowledge and sidesteps the issue of

knowledge use. Teachers do not draw on knowledge one domain at a time. Rather they weave together different kinds of knowledge as they reason about what to do and take action in particular situations (McDiarmid et. al. 1989). For instance, in planning an instructional activity, a teacher may consider what concepts she wants students to learn (content), how those topics fit with previous and future topics (curriculum), how appropriate the activity is for her particular group of students (learners), what might be difficult for them (learning), how she will find out what students do and do not understand. Researchers are just beginning to study the processes by which teachers meld different kinds of knowledge in teaching and to consider how best to represent the results.

Declarative knowledge can never be a complete guide to practice. For one thing, teaching depends on judgement and reasoning which must also be learned. Moreover, much of what teachers need to know to respond to immediate classroom situations must be discovered by them over time in their particular context (Richardson 1994). If expertise in teaching consists of knowledge and commitments tied to actions, then we must consider not only what teachers know (or need to learn), but how they transform their knowledge into professional activity (Kennedy 1987).

Tasks of Teaching

A second approach to framing the content of learning to teach begins with the question, "What should teachers be able to do?" and then reasons backwards to the knowledge and skills required for performing these tasks. This is the tack taken by the Educational Testing Service in its recent efforts to design new performance assessments for beginning teachers.

To lay the intellectual foundation for this initiative, Anne Reynolds (1992) prepared a synthesis of research reviews on effective teaching and learning to teach. Reynolds acknowledges serious problems with the literature: (1) The research does not reflect teachers' perspective; (2) Empirical evidence linking teacher actions and student learning is limited and does not generalize across settings; (3) The differences between effective experienced teachers and effective beginning teachers is not well understood; (4) What we know about teaching from the research literature may not fit our vision of

good teaching. Still, she uses it to frame a set of teaching tasks that beginning teachers should be able to perform. These tasks, she argues, fit any teaching situation regardless of the teacher's philosophy, subject matter, or students. Having an adequate knowledge base means being able to do the following:

1. Plan lessons that enable students to relate new learning to prior understanding and experience.
2. Develop rapport and personal interactions with students.
3. Establish and maintain rules and routines that are fair and appropriate to students.
4. Arrange the physical and social conditions of the classroom in ways that are conducive to learning and that fit the academic task.
5. Represent and present subject matter in ways that enable students to relate new learning to prior understanding and that help students develop metacognitive strategies.
6. Assess student learning using a variety of measurement tools and adapt instruction according to the results.
7. Reflect on their own actions and students' responses in order to improve their teaching (p. 26).

The idea of framing a knowledge base around tasks of teaching has a certain face validity. Teaching is a practical art, and the tasks of teaching cover familiar territory. Additional support for this approach comes from research on teachers' classroom knowledge which also uses the construct of "tasks" to describe the way individual teachers acquire and organize their knowledge of classroom events. According to the researchers, teachers organize their knowledge around particular tasks of teaching such as teaching lessons or maintaining order (e.g., Doyle 1986; Leinhardt and Greeno 1986). While these tasks are common to all classrooms, the meaning individual teachers bring to them is a function of their unique knowledge and experience. Furthermore as teachers act to accomplish tasks of teaching, their understanding of what a given task involves and what it means to accomplish it changes. From this perspective, teachers learn to teach as they make sense of and take on the tasks of teaching (Carter 1990).

Reynolds does not actually work out the connections between the ability to perform the tasks and the knowledge, skills, and dispositions required to do so. Rather

she identifies broad requirements such as knowledge of pedagogy appropriate to the content being taught and the disposition to find out about one's students and school and the skills to do so. But it is also the case that we simply do not know enough about how teachers think through and pull off these tasks in particular contexts or what combination of general and "local" knowledge they depend on.

Any performance model rests on ideas about the nature of teaching and the role of the teacher. Reynolds' tasks of teaching framework gives the impression that teaching is relatively straightforward work. Teachers plan lessons, arrange classroom conditions, present content so that students will learn. Teachers note the results of their actions and make appropriate adjustments. Teaching seems like a form of technical problem solving in which teachers apply familiar means to accomplish predetermined ends (Schon 1983).

A different picture emerges from studies that describe what teaching is like for teachers. Jackson (1968) portrays classrooms as complex, unpredictable, and multidimensional settings. Research on teachers' "practical" or "classroom knowledge" (e.g., Elbaz 1983; Doyle 1990; Carter and Doyle 1987) further reveals the complexities and uncertainties of interactive teaching and the need for considerable thinking-in-action (Schon 1987). For example, in a study of her own practice, Lampert (1985) argues that teachers do not solve problems; rather they navigate among competing goals as they make moment-to-moment decisions about what do to in particular instructional situations.

Both portraits capture important aspects of teaching with implications for defining the content of learning to teach. Besides learning to handle the routine and predictable, teachers must develop the capacity to think on their feet and to respond in appropriate ways to an ever-changing situation. Just as uncertainty challenges teachers, so preparing teachers for uncertainty challenges teacher educators (Floden and Buchmann 1993).

While teaching performance depends on knowledge and skills, it cannot be defined independent of purposes, commitments, and values. Except for the reference to "fairness" in relation to classroom rules and routines, the tasks of teaching framework avoids moral language. But teaching is a moral practice as well as a technical activity, and this has implications for thinking about the content of learning to teach. Besides acquiring requisite knowledge and skills, teachers must also develop values, commitments, and images of good teaching.

Professional Standards

Values and commitments figure prominently in the standards framework generated by the National Board for Professional Teaching Standards (NBPTS) which was founded in 1987 in response to a major recommendation in a Carnegie-commissioned report on education and the economy (1986). Governed by a 63-member board dominated by classroom teachers, this independent, nonprofit organization is devoted to creating a voluntary national certification system for experienced elementary and secondary teachers.

As a first step in defining professional standards, the Board adopted a policy statement entitled *What Teachers Should Know and Be Able to Do* (1990). The statement sets out five core propositions which reflect what the Board values in teaching and serve as a foundation for its work.

1. Teachers are committed to students and their learning.
2. Teachers know the subjects they teach and how to teach those subjects to students.
3. Teachers are responsible for managing and monitoring student learning.
4. Teachers think systematically about their practice and learn from experience.
5. Teachers are members of learning communities.

The policy statement underscores the value and limits of formal knowledge in teaching. In relation to the first proposition, for example, we are told that highly accomplished teachers base their practice on prevailing theories of cognition and intelligence as well as on "observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances, and peer relationships" (p. 13). We are also told that "teaching ultimately requires judgement, improvisation, and conversation about ends and means" (p. 13).

The propositions reflect teachers' responsibilities both inside and outside the classroom. For example, teachers orchestrate learning in group settings, assess student progress on a regular basis, use multiple methods to meet their goals (Proposition 3). They strengthen their teaching by seeking advice, studying educational research, reflecting on their own classroom experience (Proposition 4). They work collaboratively with parents and other professionals (Proposition 5).

Professional values and commitments lie at the heart of the standards. The first proposition articulates the ethical foundation of teachers' practice—the conviction that all students can learn and the commitment to making knowledge accessible to all. References to other values appear throughout the document—respect for disciplinary thinking, a commitment to lifelong professional development, reverence for the craft of teaching. The document invokes teachers who exemplify the personal and intellectual virtues they seek to cultivate in their students—curiosity and love of learning, tolerance and open-mindedness, fairness and justice, respect for human diversity and dignity, the ability to question received wisdom (p. 25).

The policy statement projects a vision of good teaching and an image of what it means to be a professional teacher. Good teaching emphasizes conceptual understanding, problem solving, multiple perspectives. Professional teachers make decisions based on personal experience and the best knowledge available. Excellence in teaching depends on human qualities, expert knowledge and skill, and professional commitment.

These propositions and their elaboration serve as a philosophical basis for more focused standards in thirty different areas defined by disciplines (e.g., mathematics, English/language arts, science) and developmental levels (e.g., early childhood, middle childhood, early adolescence). Compatible standards for beginning teachers have been developed by the Interstate New Teacher Assessment and Support Consortium (INTASC), a program of the Council of Chief State School Officers (1993). Both sets of professional standards reflect a vision of good teaching which is a necessary prerequisite to figuring out what teachers need to learn.

Lessons for Teacher Educators

These three examples represent "state of the art" efforts to frame a knowledge base for teaching. Associated with different purposes—teacher education, teacher assessment, teacher licensure, and teacher certification—they draw mainly on research and scholarship and, in the case of the NBPTS, on the "wisdom of practice". Overlap among the three examples suggests consensus about broad domains of knowledge and values and agreement about core tasks of teaching. Differences in focus and format

highlight the absence of a shared structure to frame a knowledge base and a way to represent expertise in teaching.

What lessons can teacher educators derive from this brief discussion of these efforts to frame the content of learning to teach? First, there is a lot to learn—more than teachers could possibly master in the limited time allotted to teacher preparation. Some of this content falls outside the traditional boundaries of the teacher education curriculum; much of it has not been codified. Second, what teachers need to learn not only includes knowledge, skills, and dispositions, but also ways of knowing, thinking, caring, and acting. Third, since much of what teachers need to know can only be learned in situ, an important part of learning to teach involves learning to learn in context. Fourth, defining the content of learning to teach depends on clarifying a vision of good teaching.

On the one hand, we seem to know quite a lot about what teachers need to learn. On the other hand, we still have mostly general statements and fragmented research. This means that teacher educators have to figure out for themselves what to teach in light of who their students are and what time frame they have to work in. Getting clear about the kind of teaching they want teachers to learn will not only help teacher educators make decisions about what to teach, it will also insure that this "content" adds up to a coherent vision of teaching.

Until now we have separated the "what" from the "how" of learning to teach in order to focus on the question of what teachers need to learn. Ultimately, content and processes of learning to teach must be brought together since how teachers learn shapes what they learn and is often part of what they need to know. Unfortunately, we know even less about the processes of learning to teach than we do about the content.

PROCESSES AND OPPORTUNITIES IN LEARNING TO TEACH

As we turn to the "how" of learning to teach, we gather together the threads of our argument in order to relate them to a consideration of learning processes and opportunities. The following general points bear on this discussion: (1) Different times and places are more or less suited to the learning of different aspects of teaching;

(2) What gets learned at one time influences teachers' readiness for and openness to subsequent learning; (3) The constellation of dispositions and beliefs, knowledge and understandings that teachers bring to a given learning opportunity affects what they learn from it; (4) The content of learning to teach takes different forms which, in turn, call for different kinds of learning opportunities; (5) How teachers learn affects what they learn.

When we talk about the "how" of learning to teach, we mean both cognitive processes and learning opportunities. Cognitive processes loosely refer to what goes on in teachers' heads. Learning opportunities include both the contexts of learning (e.g., programs, settings, interventions) and the social interactions within these contexts that promote learning. To understand how teachers learn to teach, we need to attend to teacher cognitions and to the conditions and opportunities that facilitate their learning (Cobb 1994).

By and large, research on how teachers learn has tended to focus on how teachers' beliefs, perceptions, attitudes, orientations, understandings, knowledge, skills change over time or on descriptions of the contexts of learning. Connecting the internal changes to the learning opportunities is at the heart of research on teacher learning. Scholars and researchers are just beginning to define this messy and "ill-structured" domain through their programs of research (Carter 1990; Kagan 1992; Kennedy 1993).

Promising lines of work include (a) studies of efforts to transform prospective teachers' beliefs; (b) studies of how teachers gain subject-matter knowledge and pedagogical content knowledge; (c) studies of teachers' practical knowledge and how it develops; (d) studies of how teachers learn ambitious forms of teaching on their own and in the company of other teachers; (e) studies of how teachers' knowledge, skills, and dispositions change as they participate in different teacher education programs. Because they focus on how teachers learn particular aspects or versions of teaching under specific conditions, these studies represent an important advance over previous research which tended to treat learning to teach as a global and undifferentiated process.

Conventional teacher education reflects a view of learning to teach as a two-step process of knowledge acquisition and application or transfer. Lay theories assume that learning to teach occurs through trial and error over time. Neither view captures the prevailing position that learning occurs through an interaction between the learner and

the learning opportunity. If we want to understand how and why teachers learn what they do from a given learning opportunity, we have to investigate both what the experience was like and what sense teachers made of it. If we want to design an appropriate learning opportunity, we have to clarify what we want teachers to learn, what kind of intellectual work that will entail, where teachers are in relation to the desired outcome, and what kinds of resources and activities are likely to help teachers move in the desired direction.

No single theory or model of learning can adequately account for all aspects of learning to teach. Rather we need perspectives that fit with what is being learned and that take into account who is doing the learning and when or where the learning is taking place. In this section, we briefly examine a cluster of theoretical ideas from cognitive psychology, anthropology, and sociology that seem especially relevant in thinking about how some of the important constituents of teaching are or should be learned. These ideas also help explain why teacher education has not been a powerful force in teacher learning. We use cases to link this discussion with what has come before.

Conceptual Change and Learning to Teach

We have already described the kinds of beliefs about teaching, learning, subject matter, and diversity that many teacher candidates bring to teacher preparation. While teacher educators often intend to change those beliefs, prospective teachers frequently leave teacher preparation with their beliefs intact. When such beliefs limit the range of ideas and actions that teachers consider, this consequence is problematic.

Feiman-Nemser and Buchmann (1986) report a case of mislearning during teacher preparation which illustrates the problem. The researchers describe how Janice, an elementary education major, fits ideas she encounters in her courses into a framework of beliefs based on what she saw and heard growing up, leaving her with beliefs that work against equal educational opportunities. Asked to describe an article that stood out to her, Janice selected Anyon's (1981) critique of the unequal distribution of school knowledge by social class and school location which she misinterpreted as simply a description of the way things are. She connected this to something she read in math methods on motivation—that poor children are more present-oriented and require

immediate reinforcement. Asked whether she had any experiences with children from backgrounds different from her own, Janice talked at length about Mexican migrants who worked on the family farm and whose children were not interested in going to school. Adding a final piece to the picture, she recalled a discussion in her curriculum class about "why teach poetry to lower class, low achievers" which made her think that "maybe certain things should be stressed in certain schools, depending on where they're located" (p. 247).

While current beliefs and conceptions can serve as barriers to change, they also provide frameworks for interpreting and assessing new and potentially conflicting information. That is the paradoxical role of prior beliefs. Like all learners, teachers can only learn by drawing on their own beliefs and prior experiences, but their beliefs may not help them learn new views of teaching and learning advocated by teacher educators (Bird and Anderson 1994) Recognizing the challenge of transforming prospective teachers' beliefs and committed to promoting new visions of teaching and learning, some teacher educators have turned to conceptual change models for insights about the conditions under which people are more likely to change their minds.

Conceptual change theory (Posner, Strike, Hewson, and Hertzog 1982; Strike and Posner 1985) suggests that changing teachers' beliefs depends on their recognizing discrepancies between their own views and those underlying new visions of teaching and learning. Research on human judgement suggests that change is more likely to occur if alternatives are vivid, concrete, and detailed enough to provide a plausible alternative (Nesbitt and Ross 1980).

From these theoretical perspectives and from the work of teacher educators interested in transforming teacher candidates' beliefs (see, for example, Florio and Lensmire 1990; Feiman-Nemser and Featherstone 1992; Bird, Anderson, Sullivan, and Swidler 1993; Wilcox, Schram, Lappan, and Lanier 1992; Holt-Reynolds 1992), several conditions seem necessary to induce conceptual change. First, teachers need an opportunity to consider why new practices and their associated values and beliefs are better than more conventional approaches. Second, they must see examples of these practices, preferably under realistic conditions. Third, it helps if teachers can experience such practices firsthand as learners. If we also want teachers to incorporate these ideas and

practices into their own teaching, we need to provide ongoing support and guidance (Kennedy 1991). All these requirements find additional justification in theories of situated cognition.

Situated Cognition and Learning to Teach

Teacher educators generally assume that knowledge and skills exist independently of the contexts in which they are acquired. The notion that teachers can first learn concepts and skills and then apply them in real-world teaching situations reflects this assumption. Cognitive psychologists (e.g., Brown, Collins, and Duguid 1989; Lave 1988; Resnick 1989) challenge this notion by claiming that all knowledge is situated in and grows out of the contexts of its use. Besides providing a compelling explanation for why teachers use so little of what they are taught, the theory of situated cognition directs teacher educators to embed teacher learning in "authentic" activity (Brown et al. 1989).

From studies of learning in and out of school, it appears that people build up knowledge by solving real problems using available clues, tools, and social supports (Resnick 1987a, 1987b). Traditional apprenticeships provide one model of this kind of learning. In an apprenticeship, a beginner develops flexible skills and conditional knowledge by working on genuine tasks in the company of a master. For example, Lave and Wengner (1991) describe the situated and sequenced process by which apprentice tailors learn to produce garments. From observing masters, apprentices develop an image of how an entire garment is produced while they work on specific components (e.g., a sleeve) and practice specific skills (e.g., cutting, pressing, using the sewing machine). In such an apprenticeship, knowing cannot be separated from doing.

Cognitive Apprenticeship. The term "cognitive apprenticeship" has been applied to classroom-based instructional models that incorporate key features of an apprenticeship (Brown et al. 1989; Collins, Brown, and Newman 1989). These features include authentic activity, social interaction, collaborative learning, and a teacher/coach who makes his or her knowledge and thinking visible to the learner(s). Adding "cognitive" is intended to convey the idea that the same conditions or opportunities which support the development of physical skills can also support the development of cognitive skills.

An obvious application of cognitive apprenticeship to learning to teach is student teaching, internships, and other mentored learning situations where the teacher's learning is "situated" in the context of practice. Ideally, the novice would learn how to think and act like teacher by observing and engaging in the activities of teaching alongside a more experienced practitioner. The mentor would model ways of thinking and acting, coach the novice in her attempts to carry out particular tasks, and gradually withdraw support as the novice learns to perform on her own. This calls for classroom teachers to take on the role of school-based teacher educator, a role that requires special preparation and coaching.

Assisted Performance. Vygotsky's (1978) theory of assisted performance in the zone of proximal development (ZPD) accounts for how learning through social interaction with a more capable other occurs. The ZPD is the distance between what an individual can do independently and what he or she can do with assistance. Assistance from and cooperative activity with a teacher, expert, or more capable peer enables the learner to perform at levels beyond his or her level of independent performance. Knowledge and skills which initially exist in the interaction between the novice and the more capable other eventually get internalized by the learner. Vygotsky's work is primarily concerned with children. Some contemporary proponents, claiming that identical processes operate in the learning adult, are beginning to explore the application of these ideas to teacher education (e.g., Tharp and Gallimore 1988).

We should not let the terms "situated learning," "cognitive apprenticeship", "assisted performance" mislead us into thinking that these theories only apply to teacher learning in school settings. They pertain to education courses which are often criticized for being "too theoretical" and "not very practical" as well as to teachers' academic preparation. In these university classrooms, teachers often encounter concepts and ideas disconnected from any meaningful contexts or they work alone without the benefits of collaboration or modeling.

Teachers are more likely to develop usable knowledge if we situate their learning in practice. For example, some advocates of case-based teacher education argue that cases provide one promising way to situate teacher learning in problems of practice. (See

Sykes and Bird 1994 for a review of different uses of cases in teacher education.) Through the analysis of cases, teachers can learn concepts in ways that reveal their use, and practice the kind of reasoning and problem solving that "real" teaching entails.

The learning theories and instructional models that we have reviewed constitute a valuable resource for teacher educators interested in promoting and understanding teacher learning. Besides suggesting important features of powerful interventions, these theoretical perspectives give us lens to use in explaining the learning that does (or does not) occur.

To illustrate what this could look like, we describe a unique teacher education intervention designed to help an experienced, successful elementary teacher learn to teach mathematics in new ways (Heaton and Lampert 1993). This intervention honors the contextualized quality of knowing and learning in teaching. It also shows how the kind of teaching to be learned shapes the content of the learning.

A Case of Learning to Teach for Understanding

As a doctoral student, Heaton read about the kind of mathematics teaching and learning advocated by reformers. Unsure how, as a prospective teacher educator, she would be able to help novices learn to teach in ways that she herself had never taught, Heaton decided to try to learn a new kind of mathematics teaching. She arranged to teach fourth grade mathematics next door to Lampert, a scholar and teacher educator, who was teaching math in the fifth grade and using her classroom as a setting for prospective and practicing teachers and teacher educators to study a new kind of teaching practice (Lampert 1992).

Once a week, Lampert observed Heaton's teaching and wrote notes about specific teaching problems that occurred. Heaton also observed Lampert's teaching, and they met regularly to talk about their practice. Sometimes they looked at samples of children's work or designed problems to use with their students. They also worked math problems and discussed connections between the elementary mathematics curriculum and the discipline of mathematics.

Lampert based her approach to helping Heaton on ideas about what teachers need to know and how that knowledge is learned. The approach consisted primarily of

classroom observation and discussion of situated problems of practice and alternative solutions. Lampert justifies this approach by drawing a parallel between teaching for understanding and teaching teaching for understanding. In both cases, deciding whether a solution or a practice is appropriate depends having a contextualized understanding of the problem or circumstance. By observing and reflecting on Heaton's lessons, Lampert models ways of thinking about teaching and learning. Through this process, she hopes to help Heaton develop what Shulman calls "strategic knowledge"—the knowledge that "comes into play as the teacher confronts particular situations or problems, whether theoretical, practical, or moral, where principles collide and no simple solution is possible" (Heaton and Lampert 1993, p. 58).

The kind of teaching Heaton wanted to learn requires the teacher to manage the exchange of mathematical ideas in the context of managing complex social interactions. This not only depends on having different kinds of knowledge about subject matter, students, curriculum, social interactions, teaching, and so on. It also requires holding that knowledge flexibly, "not in the form of a script, but in the form of a web of multiply connected ideas for things to try...It is not a matter of learning the rules and then following them; it is a matter of casing out the situation you are in on a moment by moment basis, watching how students react to your response, constructing a new response in a cyclical improvisation" (Heaton and Lampert 1993, p. 58).

This description recalls our earlier discussion about the interactive nature of teachers' knowledge and reinforces the intersection of the "what" and the "how" in learning to teach. In trying to conceptualize what teaching mathematics for understanding entails, Lampert is describing what we usually treat as tacit knowledge. Her formulation illustrates some of the problems with trying to frame a knowledge base around discrete domains of knowledge or generic tasks of teaching. Teacher education rarely addresses the problem of helping teachers develop coordinated or flexible or integrated knowledge. This may help explain why teacher candidates have difficulty constructing new kinds of pedagogy even when they have come to believe that it is both possible and desirable (Wilcox et al. 1992).

Describing her own learning, Heaton reports that she was faced with struggles "everywhere I turned" (Heaton and Lampert 1993, p. 60). The difficulties began with

planning—trying to follow a script yet teach in ways that opened up the discourse to students' ideas. They also encompassed how to get students to talk and then, when they did, what to do with their ideas. "Deciding which ideas to pursue, which to drop, and which to suspend for the moment was hard" (p. 61). Heaton also struggled with the mathematical questions and found her knowledge inadequate to help students learn what they needed to know. (See also Heaton 1994).

In many ways, Heaton represents our best foot forward in terms of candidates for teacher development. She had been a successful student of mathematics through college calculus. When she began working with Lampert, she was already a competent teacher who had already done the kind of teaching in social studies that she wanted to learn in mathematics. So it is instructive for teacher educators to note that Heaton still needed to learn new mathematical and pedagogical knowledge in order to teach in a way that was responsive to students' thinking and to the mathematical ideas under discussion.

Heaton's story raises many questions about what and how we teach teachers at the preservice and induction levels as well as during inservice. If preservice teacher education provided a stronger foundation in subject matter and pedagogy, what kinds of learning needs would novices present? Could those needs be addressed by creating cognitive apprenticeships with experienced teachers who were also trying to change their practice? Do experienced teachers have more to unlearn than novices when they try to embrace new forms of teaching and learning?

We note that the case says relatively little about how teachers learn to teach mathematics to diverse students. Researchers are just beginning to frame and study the question of how teachers learn to teach demanding content to all students, a question that is central to the current reform agenda. Still, we believe that this story and other stories of learning to teach for understanding bear careful reading and rereading by teacher educators not only for images and insights about what new pedagogies can look like, but also for ideas about how to help others learn to teach in these ways and to think deeply about their practice.

Clearly, there is a lot that we do not know about the content and processes of learning to teach. Teacher educators are in a good position to enlarge our understanding by inventing and studying new ways to situate teacher learning in practice. The story that

Heaton and Lampert tell is a model both for what such learning opportunities might look like and for how we can tell about them.

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